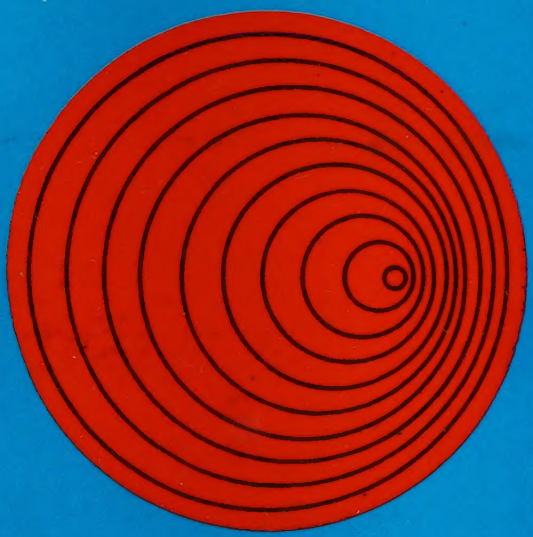
Respiratory infections in children: management in small hospitals

A manual for doctors



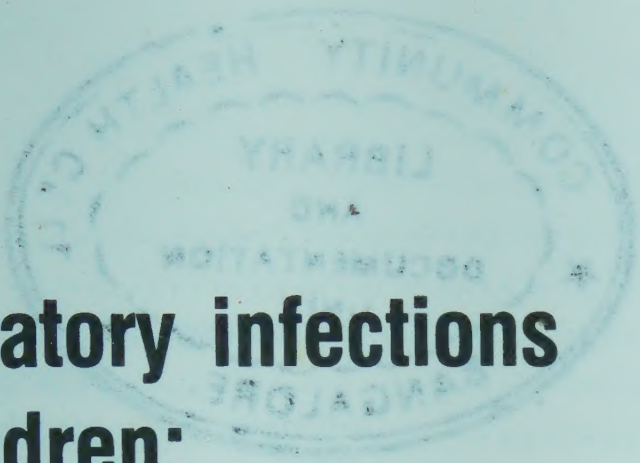
WORLD HEALTH ORGANIZATION
GENEVA

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international



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PREFACE

This booklet provides guidance on the clinical mana ment of acute respiratory infections in children. It intended primarily for use by non-specialist doctors wo ing in small district hospitals with limited X-ray and b teriology facilities, and stresses, in particular, the need f rational use of antimicrobial drugs.

The first draft was prepared, at the request of the Wo Health Organization, by Dr Frank Shann, Melbour Australia. It was then revised by the staff of the Wo Health Organization's Programme for the Control Acute Respiratory Infections, in the light of comme from:

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ITRODUCTION

Acute respiratory infections and diarrhoea are the commonest causes of death in children. The protocols in this manual have been developed by the World Health Organization using the best scientific evidence available. It is hoped that they will enable more children to receive effective treatment for severe respiratory infections, and that they will reduce the unnecessary use of antibiotics in children with mild infections.

Most children who die from acute respiratory infections are less than five years old, and most die from pneumonia. Most of the deaths are due to infections with *Haemophilus influenzae* or *Streptococcus pneumoniae*, both of which are usually sensitive to penicillin, ampicillin, amoxycillin, cotrimoxazole and chloramphenicol. Other antibiotics are usually more expensive or have more side-effects.

Prospective studies have shown that careful observation of breathing movements usually gives a more reliable indication of the severity of respiratory infection in a child than auscultation with a stethoscope — hence the emphasis on respiratory rate and chest indrawing in this manual.

The treatment regimens described in this manual have been designed for use in small hospitals where X-ray and bacteriology facilities are limited or do not exist. It is recognized that treatments other than those outlined here will be required for certain patients, depending on individual circumstances and the availability of facilities.

Further information about the regimens may be obtained from: Control of Acute Respiratory Infections, World Health Organization, 1211 Geneva 27, Switzerland.

SUMMARY OF CASE MANAGEMENT

Very severe: admit to hospital and give chloramphenicol

Cough or wheeze with cyanosis or not able to drink.

(If you do not have chloramphenicol: give benzylpenicillin, ampicillin, or amoxycillin and gentamicin.)

Severe: admit to hospital and give antibiotics

Cough with no wheeze: admit if chest indrawing is occurring.

Cough and wheeze: admit if the respiratory rate is over 50 breaths per minute.

Also admit a child with:

— stridor at rest (laryngotracheobronchitis (croup), diphtheria, epiglottitis);

— an adherent grey pharyngeal membrane (diphtheria);

— convulsions, apnoea, severe dehydration or drowsiness.

Moderate: give antibiotics at home and supportive therapy

Cough and fast breathing (50 breaths per minute) with no chest indrawing.

Red ear drum, or ear discharge for less than two weeks.

Purulent pharyngitis with large and tender lymph nodes in the neck (cervical adenitis).

Mild: give supportive therapy at home, but no antibiotics

Cough or wheeze with a respiratory rate of less than 50 breaths per minute.

Stridor absent when the child is quiet.

Blocked or runny nose.

Red throat.

Ear discharge for more than two weeks.

SUPPORTIVE THERAPY

Supportive therapy is helpful in most cases of respiratory infection. However, do not encourage ineffective supportive therapy, because it may distract people from actions necessary to save the child's life. The most useful simple supportive measures are:

The continuation of breast-feeding. If the child is not able to suck, the mother should express her milk and give it by cup and spoon.

Encouraging the child to drink especially if he or she is thirsty, dehydrated, or has diarrhoea. If the child is dehydrated and unable to drink, give intragastric fluids. Give intravenous fluids only if the child is in shock.

Encouraging the child to eat small meals frequently, but not forcing the child to eat.

Maintaining a neutral thermal environment to minimize oxygen consumption and carbon dioxide production. Putting too many clothes on the child and causing overheating are just as dangerous as exposing the child to cold. The child should be looked after, lightly clothed, in a warm room.

Giving paracetamol to reduce high fever (over 38.5 °C). Sponging with tepid or cold water should be discouraged as it is not very effective in reducing the child's temperature, and it increases oxygen consumption and carbon dioxide production.

Clearing the nose with gentle suction is important. At

home, the mother should use a moist, soft tissue or cloth, in the form of a wick, to clear out nasal secretions.

Cough suppressants, expectorants, mucolytics, decongestants, and antihistamines should not be used. They are expensive and ineffective. Local home remedies are cheap and may be helpful. An inexpensive cough mixture can be made by mixing 20 ml of concentrated peppermint water with 5 ml of a solution of amaranth (or another suitable colouring) in 2 litres of 1% ammonium chloride. The dose is one teaspoonful (5 ml) every 6 hours.

If it is available, oxygen should be administered to any child with cyanosis, or who has wheezing and a respiratory rate of over 70 breaths per minute. Oxygen should be administered by intranasal catheter at 1 litre per minute. Special low-flow meters are helpful to avoid waste and the risk of gastric dilatation. The catheter should be inserted to a depth equal to the distance from the side of the nose (ala nasi) to the front of the ear (tragus). Humidification of the oxygen is desirable, but care must be taken that the water is changed each day, and that the container, tubing and catheter are cleaned and dried twice a week to reduce the risk of bacterial contamination.

COUGH WITH WHEEZE - BRONCHIOLITIS

The first attack of wheezing in a child under 12 months old is probably due to bronchiolitis. In young infants, bronchiolitis may present as episodes of apnoea. Recurrent episodes of wheezing suggest asthma. Sometimes wheeze is due to an inhaled foreign body (see page 28).

If it is difficult to hear the wheeze, watch the child breathe. A child with wheeze takes longer than normal to breathe out, and seems to make an effort.

Almost all children with wheeze have chest indrawing, so indrawing in a child with wheeze is not an indication for admission.

Very severe bronchiolitis

Symptoms: wheezing and cyanosis, or the child is unable to drink.

1. Admit to hospital.
2. Give intranasal oxygen at 1 litre per minute.
3. Give chloramphenicol 25 mg per kg of body weight, intramuscularly, every 6 hours.
4. Clear the child's nose gently, when necessary to unblock the airway.
5. Give oral or nebulized salbutamol if the child is over 12 months old:

   — oral (1-5 years): 1 mg, 3 times a day.

   — nebulized: 0.1 mg, every 4 hours.

Do not give fluid intravenously, unless the child is in shock.

Severe bronchiolitis

Symptoms: wheezing and very fast breathing (over 70 breaths per minute), but the child is not cyanotic and is able to drink.

1. Admit to hospital.
2. Give intranasal oxygen at 1 litre per minute.
3. Give benzylpenicillin 50 000 units per kg of body weight, intramuscularly, every 6 hours.
4. Clear the child's nose gently when necessary.
5. Give oral or nebulized salbutamol if the child is over 12 months old:
   - — oral (1-5 years): 1 mg, 3 times a day.
   - — nebulized: 0.1 mg per dose, every 4 hours.

Moderate bronchiolitis

Symptoms: wheezing and fast breathing (between 50 and 70 breaths per minute), but the child is not cyanotic and is still able to drink.

1. Admit to hospital (some cases can be treated as outpatients.)
2. Give an antibiotic for at least 5 days:
   - — either procaine penicillin, 50 000 units per kg of body weight, intramuscularly, once a day;
   - — or amoxycillin, 15 mg per kg of body weight, orally, every 8 hours;
   - — or ampicillin, 25 mg per kg of body weight, orally, every 6 hours;
   - — or cotrimoxazole, 4 mg (of trimethoprim) per kg of body weight, orally, every 12 hours.

3. Give oral salbutamol if the child is over 12 months old:
   — (1-5 years): 1 mg, 3 times a day.

Mild bronchiolitis

Symptoms: wheezing without fast breathing (fewer than 50 breaths per minute), the child is not cyanotic and is able to drink.

1. Treat as an outpatient.
2. Do not give an antibiotic.
3. Give oral salbutamol if the child is over 12 months old:
   — (1-5 years): 1 mg, 3 times a day.
4. Advise the mother to:
   — continue breast-feeding.
   — encourage the child to drink.
   — encourage the child to eat.
   — come back if the child gets worse.

RECURRENT COUGH WITH WHEEZE - ASTHMA

Most children with these symptoms are more than 1 year old. Chest indrawing and respiratory rate are not reliable indicators for deciding about management. A mildly ill child may have chest indrawing, and a seriously ill child may breathe slowly. Antibiotics and antihistamines do not help.

Mild asthma

1. Treat as an outpatient.
2. Give salbutamol orally:
   - — (1-5 years): 1 mg, 3 times a day.
   - — (over 5 years): 2 mg, 3 times a day.
   - — or give epinephrine (1 mg/ml) 0.01 ml per kg of body weight, subcutaneously, followed by oral salbutamol.
3. Advise the mother to encourage the child to take fluids and to eat small frequent meals. Ask her to come back if the child gets worse.

Moderate or severe asthma

If the child does not quickly respond to epinephrine or salbutamol:

1. Admit the child to hospital.
2. Give oxygen.
3. Give nebulized salbutamol: 0.1 mg, every 4 hours.
4. Give aminophylline, 0.4 ml per kg of body weight, intravenously, slowly over 15 minutes, followed by 0.2 ml per kg of body weight given over 1 hour, every

6 hours. Use a 250 mg/100 ml ampoule and, if possible, a burette to obtain a drip feed.

Further details on the treatment of asthma vary from country to country, and are beyond the scope of this manual. Information can be found in most medical textbooks.

COUGH FOR MORE THAN 30 DAYS

Tuberculosis

Look for evidence of tuberculosis, such as:

— fever,

— large lymph nodes,

— malnutrition,

— someone in the household with tuberculosis.

If there is any suggestion of tuberculosis, arrange for the child to have a chest X-ray and an intradermal tuberculin (Mantoux) test.

Pertussis

A child with pertussis has a cough for many weeks. Pertussis (whooping cough) causes bouts of very severe coughing. Often the child whoops or vomits at the end of the coughing.

Tell the mother that the cough should slowly get better after several weeks. Do not give an antibiotic (unless the child is breathing fast or has chest indrawing when not coughing).

Asthma

Most children with a chronic cough have asthma. A child with asthma may have a wheeze and difficulty breathing out, but these signs may not be present when you see the child. The cough is often worse at night.

Give salbutamol (see page 36) — the child may need to take the drug for many weeks. Explain to the mother that the medicine will help the cough, but will not cure

it. The child will probably 'grow out' of the cough with time. Do not give antibiotics or antihistamines, they do not help.

An inhaled foreign body

There is usually a history suggesting inhalation, for example, the symptoms may have started suddenly while the child was eating or playing.

FEVER

The following factors cause or contribute to fever in children:

— upper respiratory tract infections,

— malaria,

— otitis media,

— measles,

— pneumonia,

— meningitis,

— diarrhoea,

— abscesses,

— urinary tract infections.

Take a history and do a physical examination to find out the cause of the fever.

1. Treat the cause of the fever.
2. Give paracetamol to reduce the fever if the axillary temperature is over 38.5 °C. Give 10-15 mg of paracetamol per kg of body weight, orally, every 6 hours.
3. Give antimalarials in malarious areas.
4. Encourage the child to drink and to take small, frequent feeds. Advise the mother to continue breast-feeding.

If the fever persists, and other causes are excluded, examine the urine for signs of infection.

Find the cause of the fever and treat this cause.

MEASLES

Measles is a viral infection. Treatment with antibiotics is not helpful in most cases and does not prevent bacterial complications. Give antibiotics only if there is otitis media (see page 16) or pneumonia (see pages 21-26).

Most children with measles can be treated as out-patients. Children should be admitted to hospital if they have:

— pneumonia with chest indrawing,

— severe dehydration,

— convulsions,

— a dark rash.

1. Give paracetamol if the axillary temperature is over 38.5 °C.
2. Encourage the mother to give extra fluids if the child is thirsty.
3. Give antibiotic eye ointment for conjunctivitis, only if there is pus in the eye.
4. Treat otitis media or pneumonia, if present, with procaine penicillin, amoxycillin, ampicillin or cotrimoxazole.

Remember: prevention is best.

Measles is prevented by immunization.

OTITIS MEDIA - ACUTE

The symptoms are inflammation of the tympanic membrane (ear-drum), or pus discharging from a ruptured drum for less than two weeks.

Mild redness of the ear-drum is not sufficient evidence for otitis media. There must be bulging or decreased mobility of the ear-drum.

1. Give an antibiotic for at least 5 days:

   — either procaine penicillin, 50 000 units per kg of body weight, intramuscularly, each day;

   — or amoxycillin, 15 mg per kg of body weight, orally, every 8 hours;

   — or ampicillin, 25 mg per kg of body weight, orally, every 6 hours;

   — or cotrimoxazole, 4 mg (of trimethoprim) per kg of body weight, orally, every 12 hours.

2. Give paracetamol, 10-15 mg per kg of body weight, if the axillary temperature is over 38.5 °C, or if the child is in pain.

OTITIS MEDIA - CHRONIC

The symptom is pus discharging from the ear-drum for more than two weeks. The ear will only heal when it is dry. Do not give antibiotics.

1. Wash out the ear.

   Cut the end off a clean, size 8 feeding tube so that it is only 2.5 cm long. Attach this to a clean 2-ml syringe.

   Hold the child's head firmly. Draw up 0.5 ml of clean water into the syringe. Put the cut end of the feeding tude gently into the child's ear and slowly inject the 0.5 ml of water. Then suck out the water and pus from the ear into the syringe. Throw away the dirty water.

   Refill the syringe with 0.5 ml of clean water, and repeat the treatment until no more pus comes out. You may have to do this once a day for several days. After use, clean the syringe and feeding tube thoroughly. Soak them in antiseptic solution (for example, 70% alcohol) for 15 minutes, dry them, and store them dry.

   Do not force the feeding tube deep into the ear. This will damage the ear-drum.

2. Demonstrate to the mother how to dry the child's ear.

   Roll a piece of absorbent paper into a wick and put it into the child's ear. Leave the wick in the ear for one minute. Then remove it and replace it with a clean wick. Watch the mother repeat this until the paper is dry when it comes out (about 10-15 minutes). The mother should dry the ear at home at least four times a day, until it stays dry. This usually

takes about a week. Nothing should be left in the ear between treatments. The child should not go swimming until the ear is dry.

PERTUSSIS (WHOOPING COUGH)

In pertussis, nasal discharge and fever are followed by coughing. This coughing gets progressively worse. In babies, the main symptom may be apnoea, but in older children there are paroxysms of coughing followed by a whoop, cyanosis, vomiting or a convulsion. Between paroxysms of coughing the child may look quite well.

Admit the child to hospital if:

— the child is less than 6 months old;

— there are complications such as pneumonia with fast breathing, convulsions, dehydration or malnutrition.

Outpatient treatment

1. Give paracetamol if the axillary temperature is over 38.5 °C. Cough suppressants, sedatives, mucolytics and antihistamines are unlikely to be effective, and they may be harmful.

2. Give the following advice and information to the mother:

   — warn her that the illness may last for 6 to 8 weeks;

   — encourage her to feed her child immediately after each bout of vomiting;

   — tell her to return if her child starts to breathe fast or has a convulsion.

3. Prevent the spread of pertussis — immunize any unimmunized brothers and sisters.

Inpatient treatment

1. If the child becomes cyanotic with coughing, give oxygen and apply gentle suction to clear the nose and mouth. Keep suction brief — if carried out for too long it can stimulate coughing and make the illness worse.
2. Give chloramphenicol, 25 mg per kg of body weight intramuscularly or orally, every 6 hours. This prevents the child from infecting other patients, and treats pneumonia, a frequent complication of pertussis.
3. If the child has a convulsion, give phenobarbital 15 mg per kg of body weight, intramuscularly or orally, once; then give 5 mg per kg of body weight each day for at least 10 days.
4. Encourage the mother to feed her child soon after each bout of vomiting.

Remember: prevention is best.
Pertussis is prevented by
immunization.

NEUMONIA

The symptoms are coughing and rapid breathing (over 50 breaths per minute) with no chest indrawing.

A child with chest indrawing may have severe pneumonia (see page 23). If the child is less than 4 weeks old, see *Pneumonia in neonates* on page 26. However chest indrawing also occurs with wheeze and stridor, and in these cases different treatment is needed (see pages 7-9 and pages 27-28).

Remember that careful observation of respiratory rate and chest movements when a child is quiet usually provides more reliable information about the severity of respiratory tract infection than does auscultation with a stethoscope.

1. Treat as an outpatient.

2. Give an antibiotic for at least 5 days:

   — either procaine penicillin, 50 000 units per kg of body weight, intramuscularly, once a day;

   — or amoxycillin, 15 mg per kg of body weight, orally, every 8 hours;

   — or ampicillin, 25 mg per kg of body weight, orally, every 6 hours;

   — or cotrimoxazole, 4 mg (of trimethoprim) per kg of body weight; orally, every 12 hours.

3. Advise the mother to:

   — continue breast-feeding,

   — encourage her child to drink,

— encourage her child to eat small frequent meals
— come back if her child gets worse.

If there is coughing and chest indrawing, admit the child to hospital

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NEUMONIA - SEVERE

The symptoms are coughing and chest indrawing, but the child is not cyanotic and is able to drink.

If the child is cyanotic or not able to drink, treat for very severe pneumonia (see page 24).

Chest indrawing also occurs with wheeze and stridor. In these cases follow the treatments given on pages 7-9 for wheeze and pages 27-28 for stridor.

1. Admit to hospital.
2. Give benzylpenicillin 50 000 units per kg of body weight, intramuscularly, every 6 hours.
3. Using a plastic syringe, gently suck any secretions from the child's nose when necessary to clear the airway.
4. If no improvement is noticed after 24 hours, or if the child becomes cyanotic or unable to drink at any time, treat for very severe pneumonia.

If there is coughing and cyanosis or the child is not able to drink, give chloramphenicol

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PNEUMONIA - VERY SEVERE

The symptoms are coughing and chest indrawing plus cy nosis, or inability to drink.

Chest indrawing also occurs with wheeze and stridor. I these cases follow the treatments given on pages 7-9 fc wheeze and pages 27-28 for stridor.

If the child is drowsy or has convulsions do a lumb puncture to investigate for possible meningitis.

1. Admit to hospital.
2. Give intranasal oxygen at 1 litre per minute if th child is cyanotic.
3. Give chloramphenicol, 25 mg per kg of body weig (maximum 1 g per dose), intramuscularly, every hours. When the child has improved (usually aft 3-5 days), change to oral chloramphenicol. Gi chloramphenicol for at least 10 days. If you have r chloramphenicol, give benzylpenicillin plus an amin glycoside (for example gentamicin). Children wi staphylococcal pneumonia can be treated with chlo amphenicol or with cloxacillin (or oxacillin) plus ge tamicin.
4. Using a syringe, gently suck any secretions from th child's nose when necessary to clear the airway.
5. If the child is dehydrated and unable to drink, gi fluid by the intragastric route. If the child is shock, give fluids intravenously. When judging wh quantity of fluid to give, bear in mind that these ch dren easily develop pulmonary oedema and respir tory failure.

If there is coughing and cyanosis
or the child is not able to drink,
give chloramphenicol

NEUMONIA - PERSISTENT

Occasionally a child with pneumonia remains ill despite 10-14 days of treatment with adequate doses of chloramphenicol. There is usually chest indrawing, a high respiratory rate, and a low-grade fever. Possible causes are:

— tuberculosis — seek history of contact, and carry out a Mantoux test and bacteriological examination of gastric aspirates;

— asthma — look for prolonged expiratory phase, listen for wheeze and rhonchi;

— foreign body — seek history of sudden onset of symptoms while feeding or playing, take inspiratory and expiratory chest X-rays;

— heart failure — look for large heart (greater than 60% of the thoracic diameter in infants), murmur, high venous pressure, hepatomegaly, tachycardia;

— chlamydia or pneumocystis infection which may occur even in immunologically normal infants.

1. Record the resting respiratory rate each day.
2. If the presence of a foreign body, heart failure, and asthma seem unlikely, consider a trial of high-dose cotrimoxazole (10 mg of trimethoprim per kg of body weight, every 12 hours) to treat chlamydia and pneumocystis. If there is improvement after 1-2 weeks of cotrimoxazole, give the drug for a total of 3 weeks.
3. If tuberculosis seems likely, or if there is no improvement after 2 weeks of cotrimoxazole, consider giving tuberculosis therapy (see page 30).

PNEUMONIA IN NEONATES

A neonate is an infant of less than 4 weeks old. However, the same case management is applicable for infant up to 2 months old.

It may be difficult to diagnose pneumonia in a neonate since he or she may not have a cough. Babies should be treated for pneumonia if they are over 4 hours old and have any of the following symptoms.

— respiratory rate of over 60 breaths per minute;

— chest indrawing;

— grunting (short, gruff sounds that a child makes when having difficulty breathing).

1. Admit to hospital.

2. Give benzylpenicillin 50 000 units per kg of body weight, intramuscularly, every 12 hours, for at least days, and either:

   — streptomycin, 25 mg per kg of body weight, intramuscularly, once a day;

   — or kanamycin, 10 mg per kg of body weight intramuscularly, every 12 hours;

   — or gentamicin, 2.5 mg per kg of body weight intramuscularly, every 12 hours.

3. Give intranasal oxygen 0.5 litres per minute if the baby is cyanotic.

STRIDOR

Laryngotracheobronchitis (croup)

The main sign of croup is a harsh inspiratory noise called stridor. There is typically an upper respiratory tract infection for one or two days, then the child develops a harsh, barking cough and a hoarse voice. The symptoms are often worse at night.

Children with mild croup can be treated at home. Symptoms may be reduced by inhalation of steam from boiling water. The child should sit on the lap of an adult near a kettle of boiling water. Allow enough distance for the steam to cool a little before the child breathes it in. Do not give antibiotics.

Children who have stridor and chest indrawing when they are resting quietly may develop complete obstruction. They should be admitted to hospital because they may need a tracheostomy. Do not give oxygen, because it may mask the signs of obstruction. Cold steam, cough suppressants and mucolytics are ineffective. Disturb the child as little as possible, but watch carefully for signs of obstruction — severe chest indrawing, restlessness, or pallor. Do not wait until the child develops cyanosis to do a tracheostomy. Give chloramphenicol (see dosage table on page 34). Tracheostomy is very difficult to perform in small children — if possible transfer the child to the care of an experienced surgeon before severe symptoms develop.

Diphtheria

Laryngeal diphtheria may present with inspiratory stridor, a harsh cough and a hoarse voice, and may, therefore, be confused with croup. Examine the child's throat, and look for a greyish adherent pharyngeal membrane. Be

very gentle when you examine the throat, because it very easy to cause complete airway obstruction. Giv 40 000 units of diphtheria antitoxin, intramuscular or intravenously, and procaine penicillin 50 000 uni per kg of body weight, intramuscularly, each day fo 7 days.

Tracheostomy may be required for airway obstruction.

Foreign body

An inhaled foreign body may cause stridor and coug with a sudden onset. It is also an occasional cause o wheeze, persistent pneumonia, and cough for more tha 30 days. There is no preceding illness and the chi usually has a normal voice. There is usually a histo that suggests inhalation of a foreign body — for exampl the symptoms began suddenly while the child was eati or playing. If you suspect a foreign body, refer the chi to a surgeon who can do a bronchoscopy. If the chi has rapid breathing (more than 50 breaths per minute) gi an antibiotic, since there may be secondary infection.

RACHEOBRONCHITIS

This is characterized by a productive cough and rhonchi without cyanosis, chest indrawing, or fast breathing.

Tracheobronchitis is very common in children. It usually begins with a dry cough that becomes loose after 2 or 3 days, when low-pitched rhonchi and a few course crepitations may be heard. If present, wheeze is almost always due to asthma or bronchiolitis. The term 'wheezy bronchitis' should not be used.

Tracheobronchitis is almost always caused by a viral infection (respiratory syncytial virus, influenza virus, parainfluenza virus or rhinovirus). It is occasionally caused by *Mycoplasma pneumoniae*.

1. Give paracetamol if the axillary temperature is above 38.5 °C.
2. Advise the mother to give extra fluids if her child is thirsty, and to come back if the child starts to breathe quickly.
3. Antibiotics should not be given.
4. Cough suppressants, mucolytics, vasoconstrictors and antihistamines are not effective, they may even be harmful.

TUBERCULOSIS

Suspect tuberculosis in a child with:

— cough for more than 30 days,

— persistent fever without an obvious cause,

— large lymph nodes,

— malnutrition.

Or if:

— someone in the household has tuberculosis.

Carry out these investigations:

— chest X-ray.

— intradermal tuberculin (Mantoux) test with 2 Tube lin Units of Purified Protein Derivative (PPD) (v Tween 80); 10 mm or more of induration is p tive. The tuberculin test may be negative in child with malnutrition or tuberculous meningitis.

— microscopy and culture of lymph node, gastric aspir pleural fluid, ascites or cerebrospinal fluid.

Give the tuberculosis treatment recommended for child in your country. The standard treatment for tubercul in children is isoniazid and thioacetazone daily for months, plus streptomycin daily for the first 1-2 mon Short-course chemotherapy is now used in sc countries. Two short-course regimens are:

— isoniazid, rifampicin and pyrazinamide daily for first 2 months then isoniazid and thioacetazone d for the next 6 months.

— isoniazid, rifampicin and pyrazinamide daily fo months, then isoniazid and rifampicin daily, or twi week, for 4 months.

The usual doses of drugs for treatment of tuberculosis in children are given below:

Drug	Dose (mg per kg of body weight per day)	Maximum dose (mg per day)
isoniazid	10	300
pyrazinamide	25	2000
rifampicin	10	600
streptomycin	15	1000
thioacetazone	2.5	150

UPPER RESPIRATORY TRACT INFECTIONS

Colds, pharyngitis, tonsillitis

Most children with an upper respiratory tract infecti should not be given an antibiotic. Do not give an an biotic just because the child has a high fever, purule nasal discharge, or a red throat.

1. Give paracetamol if the axillary temperature is abo 38.5 °C.
2. Give any immunizations that are due.
3. Advise the mother to encourage her child to eat a drink, and to come back if the child starts to breat fast.
4. Do not give cough suppressants, mucolytics, vasoco strictors or antihistamines. They are not effecti and they may be harmful.

Purulent pharyngitis or tonsillitis

For children under the age of 5 years, give antibiotics or if there are enlarged and tender lymph nodes in the nec

Give one dose of benzathine penicillin 50 000 units p kg of body weight, or 10 days of:

— procaine penicillin, 50 000 units per kg of bo weight, intramuscularly, daily;

— or amoxycillin, 15 mg per kg of body weight, oral every 8 hours;

— or ampicillin, 25 mg per kg of body weight, oral every 6 hours;

— or cotrimoxazole, 4 mg (of trimethoprim) per kg body weight, orally, every 12 hours.

For children aged 5 years or older with purulent pharyngitis, give one of the following antibiotics, even if there are no enlarged or tender lymph nodes in the neck:

— one intramuscular injection of benzyl penicillin;

— or procaine penicillin, once a day, for 10 days;

— or phenoxymethyl penicillin, 250 mg, orally, every 6 hours for 10 days.

TABLE OF DRUG DOSES

Drug	Dose	Frequency	Means of administration	Form		Actual dose (in tablets, capsules, or ml) according to body weight in kg						
						3-5	6-9	10-14	15-19	20-29	30-49	Adult
Amoxycillin	15 mg per kg of body weight	every 8 hours	oral	250-mg tablet	tablet	0.25	0.5	0.5	1	1	1	1-2
Ampicillin	25 mg per kg of body weight	every 6 hours	oral	250-mg tablet	tablet	0.5	0.5	1	1	2	2	2
Chloramphenicol	25 mg per kg of body weight	every 6 hours	intramuscular or intravenous	vial of 1 g; mix with 4 ml of sterile water	ml	0.5	1	1.5	2	2.5	3	4
			oral	125 mg/5 ml suspension	ml	6	8	12	15	—	—	—
			oral	250-mg capsule	capsule	—	—	1	1	2	3	4
Cloxacillin	25-50 mg per kg of body weight	every 6 hours	intramuscular or intravenous	vial of 250 mg; mix with 1 ml of sterile water	ml	0.5	0.5	1	1	1.5	2	2
			oral	250 mg capsule	capsule	—	—	1	1	1	2	2

Drug	Dose	Frequency	Means of administration	Form		Actual dose (in tablets, capsules, or ml) according to body weight in kg						
						3-5	6-9	10-14	15-19	20-29	30-49	Adult
Cotrimoxazole	4 mg of trimethoprim per kg of body weight	every 12 hours	oral	tablet containing 80 mg of trimethoprim + 400 mg of sulfamethoxazole	tablet	0.25	0.5	0.5	0.5	1	1.5	2
Gentamicin	2.5 mg per kg of body weight	every 8 hours	intramuscular or intravenous	vial containing 20 mg/ml (20 000 I.U.)	ml	1	2	3	—	—	—	—
				vial containing 80 mg (80 000 I.U.); mix with 6 ml sterile water	ml	1	2	3	—	—	—	—
				vial containing 80 mg (80 000 I.U.) undiluted	ml	0.25	0.5	0.75	1	1.5	1.5	2

Table of drug doses (*continued*)

Drug	Dose	Frequency	Means of administration	Form		Actual dose (in tablets, capsules, or ml) according to body weight in kg						
						3-5	6-9	10-14	15-19	20-29	30-49	Adult
Paracetamol	10-15 mg per kg of body weight	every 6 hours	oral	100-mg tablet	tablet	0.5	1	1	1.5	—[a]	—[a]	—[a]
				500-mg tablet	tablet	—	0.25	0.25	0.5	1[a]	1[a]	1[a]
Penicillin Benzyl-penicillin (Penicillin G)	50 000 units per kg of body weight	every 6 hours	intramuscular	vial of 1 000 000 units; mix with 2 ml of sterile water	ml	0.5	1	1	2	2	2	2
Procaine Penicillin	50 000 units per kg of body weight	daily	intramuscular	vial of 4 000 000 units ; mix with 5 ml of sterile water	ml	0.5	0.75	1	1	1.5	1.5	2
Salbutamol	0.1 mg per kg of body weight	3 times a day	oral	2-mg tablet	tablet	—	—	0.5	0.5	1	2	2
				4-mg tablet	tablet	—	—	0.25	0.25	0.5	1	1

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